

Indiana State Department of Health

Extract of Non-Medical Radiography Regulations (Using Radioactive Materials)

This extract has been prepared to provide non-medical radiation machine facilities with the sections of 410 IAC 5 most pertinent to their operations. This extract is not intended to cover all the regulations which may apply to any particular facility, just those that are the most crucial to compliance. Should there be any questions regarding this document, call AC 317/233-7147 and ask for the x-ray machine compliance coordinator.

Rule 2. Registration of Radiation Machine Facilities and Service

Cited in: 410 IAC 5-2-1; 410 IAC 5-2-2; 410 IAC 5-2-3; 410 IAC 5-2-7; 410 IAC 5-9-1; 410 IAC 5-9-2; 410 IAC 5-9-2.5; 410 IAC 5-9-3; 410 IAC 5-10-1; 410 IAC 5-10-1-1.

410 IAC 5-2-1 Scope of rules; registration of materials

Authority: IC 13-1-2-9; IC 13-1-2-11; IC 16-1-3-13
Affected: IC 13-1-2

Sec. 1. (a) 410 IAC 5-2 provides for the registration of radiation machine facilities.

(b) In addition to the requirements of 410 IAC 5-2, all registrants are subject to the applicable provisions of other sections of 410 IAC 5.

(c) In addition to 410 IAC 5-2-1(a) and 410 IAC 5-2-1(b) each person who receives, possesses, uses, transfers or acquires radioactive material shall register such materials with the board in accordance with the requirements of 410 IAC 5-2. This requirement is effective until the state enters into an effective agreement with the U.S. Nuclear Regulatory Commission for the transfer of regulatory authority under Sec. 274(b) of the Atomic Energy Act of 1954, as amended (73 Stat. 689) at which time 410 IAC 5-3, Licensing of Radioactive Material, becomes effective.

(Indiana State Department of Health; Rule HRH-2, PT B, Sec B.1; filed May 26, 1978, 3:30 pm: 1 IR 135; filed Feb 29, 1984, 10:10 am: 7 IR 839)

Cited in: 410 IAC 5-2-2.

410 IAC 5-2-2 Definitions

Authority: IC 13-1-2-9; IC 13-1-2-11; IC 16-1-3-13
Affected: IC 13-1-2

Sec. 2. (a) For purposes of 410 IAC 5-2, "facility" means the location at which one or more devices or sources are installed and/or located within one building, vehicle, or under one roof and are under the same administrative control.

(b) Pursuant to 410 IAC 5-2-1(c) "radiation machine" as used throughout 410 IAC 5-2 also refers to radioactive material.

(Indiana State Department of Health; Rule HRH-2, PT B, Sec B.2; filed May 26, 1978, 3:30 pm: 1 IR 135; filed Feb 29, 1984, 10:10 am: 7 IR 840)

410 IAC 5-2-3 Exemptions

Authority: IC 13-1-2-9; IC 13-1-2-11; IC 16-1-3-13
Affected: IC 13-1-2

Sec. 3. (a) Electronic equipment that produces radiation incidental to its operation for other purposes is exempt from the

registration and notification requirements of 410 IAC 5-2, providing dose equivalent rate averaged over an area of 10 square cm does not exceed 0.5 mrem per hour at 5 cm from any accessible surface of such equipment. The production, testing or factory servicing of such equipment shall not be exempt.

(b) Radiation machines while in transit or storage incident thereto are exempt from the requirements of 410 IAC 5-2.

(c) Domestic television receivers are exempt from the requirements of 410 IAC 5-2.

(Indiana State Department of Health; Rule HRH-2, PT B, Sec B.3; filed May 26, 1978, 3:30 pm: 1 IR 135; filed Feb 29, 1984, 10:10 am: 7 IR 840)

410 IAC 5-2-4 Application for registration of facility

Authority: IC 13-1-2-9; IC 13-1-2-11; IC 16-1-3-13
Affected: IC 13-1-2

Sec. 4. Each person having a radiation machine facility shall:

(a) Register such facility with the board prior to the operation of a radiation machine facility. The registration shall be completed on forms furnished by the board and shall contain all the information required by the form and accompanying instructions.

(b) Designate on the application form an individual to be responsible for radiation protection.

(Indiana State Department of Health; Rule HRH-2, PT B, Sec B.4; filed May 26, 1978, 3:30 pm: 1 IR 135; filed Feb 29, 1984, 10:10 am: 7 IR 840)

410 IAC 5-2-5 Issuance of registration

Authority: IC 13-1-2-9; IC 13-1-2-11; IC 16-1-3-13
Affected: IC 13-1-2

Sec. 5. (a) Upon a determination that an applicant meets the requirements of 410 IAC 5, the board shall issue a registration.

(b) The board may incorporate in the registration at the time of issuance or thereafter by appropriate rule, regulation or order, such additional requirements and conditions with respect to the registrant's receipt, possession, use and transfer of radiation machines as it deems appropriate or necessary.

(Indiana State Department of Health; Rule HRH-2, PT B, Sec B.5; filed May 26, 1978, 3:30 pm: 1 IR 135; filed Feb 29, 1984, 10:10 am: 7 IR 840)

410 IAC 5-2-6 Notice of changes

Authority: IC 13-1-2-9; IC 13-1-2-11; IC 16-1-3-13
Affected: IC 13-1-2

Sec. 6. The registrant shall notify the board in writing before making any change which would render the information contained in the registration no longer accurate.

(Indiana State Department of Health; Rule HRH-2,PT B,Sec B.6; filed May 26, 1978, 3:30 pm: 1 IR 135; filed Feb 29, 1984, 10:10 am: 7 IR 841)

410 IAC 5-2-7 Advertising prohibitions

Authority: IC 13-1-2-9; IC 13-1-2-11; IC 16-1-3-13
Affected: IC 13-1-2

Sec. 7. No person, in any advertisement, shall refer to the fact that he or his facility is registered with the board pursuant to the provisions of 410 IAC 5-2 and no person shall state or imply that any activity under such registration has been approved by the board.

(Indiana State Department of Health; Rule HRH-2,PT B,Sec B.7; filed May 26, 1978, 3:30 pm: 1 IR 135; filed Feb 29, 1984, 10:10 am: 7 IR 841)

410 IAC 5-2-8 Dealers and assemblers; duties; notice and reports to board

Authority: IC 13-1-2-9; IC 13-1-2-11; IC 16-1-3-13
Affected: IC 13-1-2

Sec. 8. (a) Any person who sells, leases, transfers, lends, disposes, assembles, or installs radiation machines in this state shall notify the board within 15 days of:

(1) the name and address of persons who have received these machines;

(2) the manufacturer, model, and serial number of each radiation machine transferred; and

(3) the date of transfer of each radiation machine.

(b) In the case of diagnostic x-ray systems which contain certified components, a copy of the assembler's report prepared in compliance with requirements of the Federal Diagnostic X-Ray Standard (21 CFR 1020.30(d)) shall be submitted to the board within 15 days following completion of the assembly. Such report shall suffice in lieu of any other report by the assembler.

(c) No person shall make, sell, lease, transfer, lend, assemble, or install radiation machines or the supplies used in connection with such machines unless such supplies and equipment when properly placed in operation and used shall meet the requirements of 410 IAC 5.

(Indiana State Department of Health; Rule HRH-2,PT B,Sec B.8; filed May 26, 1978, 3:30 pm: 1 IR 135; filed Feb 29, 1984, 10:10 am: 7 IR 841)

410 IAC 5-2-9 Bringing radiation machine into state; application

Authority: IC 13-1-2-9; IC 13-1-2-11; IC 16-1-3-13
Affected: IC 13-1-2

Sec. 9. (a) Whenever any radiation machine is to be brought into the state, for any temporary use, the person proposing to bring such machine into the state shall give written notice to the board at least two (2) working days before such machine is to be used in the state. The notice shall include the type of radiation

machine; the nature, duration, and scope of use; the exact location(s) where the radiation machine is to be used; and states in which this machine is registered. If for a specific case the two working-day period would impose an undue hardship on the person, he may, upon application to the board, obtain permission to proceed sooner.

(b) The person referred to in 410 IAC 5-2-9(a) shall:

(1) comply with all applicable requirements of the board including the certification of x-ray machine operators;

(2) supply the board with such other information as the board may reasonably request; and

(3) not operate within the state on a temporary basis in excess of 180 calendar days per year.

(Indiana State Department of Health; Rule HRH-2,PT B,Sec B.9; filed May 26, 1978, 3:30 pm: 1 IR 136; filed Feb 29, 1984, 10:10 am: 7 IR 841)

Rule 4. Protection and Exposure Standards

Cited in: 410 IAC 5-3-2; 410 IAC 5-3-6; 410 IAC 5-3-7; 410 IAC 5-3-11; 410 IAC 5-3-12.5; 410 IAC 5-3-25.2; 410 IAC 5-3-30; 410 IAC 5-3-31; 410 IAC 5-3-32; 410 IAC 5-4-1; 410 IAC 5-4-7; 410 IAC 5-4-11; 410 IAC 5-4-12; 410 IAC 5-4-21; 410 IAC 5-4-24; 410 IAC 5-5-8; 410 IAC 5-5-12; 410 IAC 5-5-13; 410 IAC 5-6-9; 410 IAC 5-7-2; 410 IAC 5-9-1; 410 IAC 5-9-2.5; 410 IAC 5-9-5; 410 IAC 5-10-2; 410 IAC 5-10.1-1; 410 IAC 5-10.1-5; 410 IAC 5-10.1-15; 410 IAC 5-10.1-16; 410 IAC 5-10.1-25.

410 IAC 5-4-1 Scope of rule

Authority: IC 13-1-2-9; IC 13-1-2-11; IC 16-1-3-13
Affected: IC 13-1-2

Sec. 1. (a) 410 IAC 5-4-1 establishes standards for protection against radiation hazards. Except as otherwise specifically provided, 410 IAC 5-4 applies to all licensees or registrants. It is the purpose of 410 IAC 5-4 to control the possession, use, and transfer of sources of radiation by any licensee or registrant in such a manner that the total dose to an individual does not exceed the standards of radiation protection prescribed in 410 IAC 5-4. Nothing in 410 IAC 5-4 shall be interpreted as limiting the intentional exposure of patients to radiation for the purpose of medical diagnosis or therapy.

(b) In addition to complying with the rules set forth in 410 IAC 5-4, every reasonable effort should be made to maintain radiation exposures, and releases of radioactive materials in effluents to unrestricted areas, as low as is reasonably achievable. The term "as low as is reasonably achievable" means as low as is reasonably achievable taking into account the state of technology, and the economics of improvements in relation to benefits to the public health and safety, and other societal and socio-economic considerations, and in relation to the utilization of ionizing radiation in the public interest.

(Indiana State Department of Health; Rule HRH-2,PT D,Sec D.1; filed May 26, 1978, 3:30 pm: 1 IR 174; filed Feb 29, 1984, 10:10 am: 7 IR 897)

410 IAC 5-4-2 Radiation dose to individuals in restricted areas¹

Authority: IC 13-1-2-9; IC 13-1-2-11; IC 16-1-3-13
Affected: IC 13-1-2

¹ For determining the doses specified in 410 IAC 5-4-2 a dose from x or gamma rays up to 10 MeV may be assumed to be equivalent to the exposure measured by a properly calibrated appropriate instrument in air at or near the body surface in the region of the highest dose rate.

Sec. 2. (a) In accordance with the provisions of 410 IAC 5-4-3(a), and except as provided in 410 IAC 5-4-2(b), no licensee or registrant shall possess, use, receive, or transfer sources of radiation in such a manner as to cause any individual in a restricted area to receive in any period of one calendar quarter from all sources of radiation in the licensee's or registrant's possession a total occupational dose in excess of the standards specified in the following table:

Rems per Calendar Quarter

Whole body; head and trunk; active blood-forming organs; lens of eyes; or gonads	1.25
Hands and forearms; feet and ankles	18.75
Skin of whole body	7.5

(b) A licensee or registrant may permit an individual in a restricted area to receive a total occupational dose to the whole body greater than that permitted under 410 IAC 5-4-2(a), provided:

(1) During any calendar quarter, the total occupational dose to the whole body from sources of radiation in the licensee's or registrant's possession shall not exceed 3 rem; and

(2) The dose to the whole body, when added to the accumulated occupational dose to the whole body, shall not exceed 5(N-18) rem where "N" equals the individual's age in years at his last birthday; and

(3) The licensee or registrant has determined the individual's accumulated occupational dose to the whole body on board form "Y" or on a clear and legible record containing all the information required in that form and has otherwise complied with the requirements of 410 IAC 5-4-3. As used in 410 IAC 5-4-2(b), "dose to the whole body" shall be deemed to include any dose to the whole body, gonads, active bloodforming organs, head and trunk, or lens of eye.

(Indiana State Department of Health; Rule HRH-2, PT D, Sec D.101; filed May 26, 1978, 3:30 pm; 1 IR 174; filed Feb 29, 1984, 10:10 am; 7 IR 897)
Cited in: 410 IAC 5-3-13; 410 IAC 5-4-3; 410 IAC 5-4-4; 410 IAC 5-4-5; 410 IAC 5-4-10; 410 IAC 5-4-24; 410 IAC 5-6-3; 410 IAC 5-6-8; 410 IAC 5-6-10; 410 IAC 5-7-2; 410 IAC 5-8-4; 410 IAC 5-8-6; 410 IAC 5-9-6; 410 IAC 5-10-1-21.

410 IAC 5-4-3 Disclosure of prior exposure; certification for excess exposure (form Y)

Authority: IC 13-1-2-9; IC 13-1-2-11; IC 16-1-3-13

Affected: IC 13-1-2

Sec. 3. (a)(1) Each licensee or registrant shall require any individual, prior to first entry of the individual into the licensee's or registrant's restricted area during each employment or work assignment under such circumstances that the individual will receive or is likely to receive in any period of 1 calendar quarter an occupational dose in excess of 25 percent of the applicable standards specified in 410 IAC 5-4-2(a) and 410 IAC 5-4-5(a), to disclose in a written, signed statement, either:

(i) That the individual had no prior occupational dose during the current calendar quarter, or

(ii) The nature and amount of any occupational dose which the individual may have received during the specifically identified current calendar quarter, from sources of radiation possessed or controlled by other persons.

(2) Each licensee or registrant shall maintain records of such statements until the board authorizes disposition.

(b) Before permitting, pursuant to 410 IAC 5-4-2(b), any individual in a restricted area to receive an occupational radiation dose in excess of the standards specified in 410 IAC 5-4-2(a), each licensee or registrant shall:

(1) obtain a certificate on board form "Y" or on a clear and legible record containing all the information required in that form, signed by the individual, showing each period of time after the individual attained the age of 18 in which the individual received an occupational dose of radiation; and

(2) calculate on board form "Y" in accordance with the instructions appearing therein, or on a clear and legible record containing all the information required in that form, the previously accumulated occupational dose received by the individual and the additional dose allowed for that individual under 410 IAC 5-4-2(b).

(c)(1) In the preparation of board form "Y," or a clear and legible record containing all the information required in that form, the licensee or registrant shall make a reasonable effort to obtain reports of the individual's previously accumulated occupational dose. For each period for which the licensee or registrant obtains such reports, he shall use the dose shown in the report in preparing the form. In any case where a licensee or registrant is unable to obtain reports of the individual's occupational dose for a previous complete calendar quarter, it shall be assumed that the individual has received the occupational dose specified in whichever of the following columns that apply:

Part of Body	Column 1	Column 2
	Assumed Dose in Rems for Calendar Quarters Prior to January 1, 1961	Assumed Dose in Rems for Calendar Quarters Beginning on or After January 1, 1961
Whole body, gonads, active blood-forming organs, head and trunk, lens of eye	3¾	1¼

(2) The licensee or registrant shall retain and preserve records used in preparing board form "Y" until the board authorizes their disposition. If calculation of the individual's accumulated occupational dose for all periods prior to January 1, 1961, yields a result higher than the applicable accumulated dose value for the individual as of that date, as specified in 410 IAC 5-4-2(b)(2), the excess may be disregarded.

(Indiana State Department of Health; Rule HRH-2, PT D, Sec D.102; filed May 26, 1978, 3:30 pm: 1 IR 175; filed Feb 29, 1984, 10:10 am: 7 IR 897)
Cited in: 410 IAC 5-4-2; 410 IAC 5-6-3.

410 IAC 5-4-5 Exposure of minors²

Authority: IC 13-1-2-9; IC 13-1-2-11; IC 16-1-3-13
Affected: IC 13-1-2

Sec. 5. (a) No licensee or registrant shall possess, use, or transfer sources of radiation in such a manner as to cause any individual within a restricted area, who is under 18 years of age, to receive in any period of 1 calendar quarter from all sources of radiation in such licensee's or registrant's possession a dose in excess of 10 percent of the standards specified in the table in 410 IAC 5-4-2(a).

(b) No licensee or registrant shall possess, use, or transfer radioactive material in such a manner as to cause any individual within a restricted area, who is under 18 years of age to be exposed to airborne radioactive material in an average concentration in excess of the limits specified in Appendix A, 410 IAC 5-4-27, Table II. For purposes of this paragraph, concentrations may be averaged over periods not greater than a week.

(c) The provisions of 410 IAC 5-4-4(b)(2) and 410 IAC 5-4-4(c) shall apply to exposures subject to 410 IAC 5-4-5(b) except that the references in 410 IAC 5-4-4(b)(2) and 410 IAC 5-4-4(c) to Appendix A, 410 IAC 5-4-27, Table I, Column 1 shall be deemed to be references to Appendix A, 410 IAC 5-4-27, Table II, Column 1.

(Indiana State Department of Health; Rule HRH-2, PT D, Sec D.104; filed May 26, 1978, 3:30 pm: 1 IR 177; filed Feb 29, 1984, 10:10 am: 7 IR 900)
Cited in: 410 IAC 5-4-3; 410 IAC 5-4-24; 410 IAC 5-6-10.

410 IAC 5-4-6 Permissible levels of radiation from external sources in unrestricted areas³

Authority: IC 13-1-2-9; IC 13-1-2-11; IC 16-1-3-13
Affected: IC 13-1-2

Sec. 6. (a) Except as authorized by the board pursuant to 410 IAC 5-4-6(b) no licensee or registrant shall possess, use, or transfer sources of radiation in such a manner as to create in any unrestricted area from such sources of radiation in his possession:

(1) Radiation levels which, if an individual were continuously present in the area, could result in his receiving a dose in excess of 2 millirems in any 1 hour; or

(2) Radiation levels which, if an individual were continuously present in the area could result in his receiving a dose in excess of 100 millirems in any 7 consecutive days.

(b) Any person may apply to the board for proposed limits upon levels of radiation in unrestricted areas in excess of those specified in 410 IAC 5-4-6(a) resulting from the applicant's

possession or use of sources of radiation. Such applications should include information as to anticipated average radiation levels and anticipated occupancy times for each unrestricted area involved. The board will approve the proposed limits if the applicant demonstrates to the satisfaction of the board that the proposed limits are not likely to cause any individual to receive a dose to the whole body in any period of 1 calendar year in excess of 0.5 rem.

(Indiana State Department of Health; Rule HRH-2, PT D, Sec D.105; filed May 26, 1978, 3:30 pm: 1 IR 177; filed Feb 29, 1984, 10:10 am: 7 IR 900)
Cited in: 410 IAC 5-5-3; 410 IAC 5-5-3.2; 410 IAC 5-6-10; 410 IAC 5-8-4; 410 IAC 5-9-6; 410 IAC 5-10-1-21.

410 IAC 5-4-9 Surveys

Authority: IC 13-1-2-9; IC 13-1-2-11; IC 16-1-3-13
Affected: IC 13-1-2

Sec. 9. Each licensee or registrant shall make or cause to be made such surveys as may be necessary for him to establish compliance with 410 IAC 5.

(Indiana State Department of Health; Rule HRH-2, PT D, Sec D.201; filed May 26, 1978, 3:30 pm: 1 IR 178; filed Feb 29, 1984, 10:10 am: 7 IR 902)
Cited in: 410 IAC 5-4-21; 410 IAC 5-5-7; 410 IAC 5-8-4; 410 IAC 5-10-1-8.

410 IAC 5-4-10 Personnel monitoring requirements⁴

Authority: IC 13-1-2-9; IC 13-1-2-11; IC 16-1-3-13
Affected: IC 13-1-2

Sec. 10. Each licensee or registrant shall supply appropriate personnel monitoring equipment to, and shall require the use of such equipment by:

(a) Each individual who enters a restricted area under such circumstances that he receives, or is likely to receive, a dose in any calendar quarter in excess of 25 percent of the applicable value specified in 410 IAC 5-4-2(a);

(b) Each individual under 18 years of age who enters a restricted area under such circumstances that he receives, or is likely to receive, a dose in any calendar quarter in excess of 5 percent of the applicable value specified in 410 IAC 5-4-2(a);

(c) Each individual who enters a high radiation area.

(Indiana State Department of Health; Rule HRH-2, PT D, Sec D.202; filed May 26, 1978, 3:30 pm: 1 IR 178; filed Feb 29, 1984, 10:10 am: 7 IR 902)
Cited in: 410 IAC 5-4-21; 410 IAC 5-6-3.

410 IAC 5-4-11 Caution signs and labels; alarm signals

Authority: IC 13-1-2-9; IC 13-1-2-11; IC 16-1-3-13
Affected: IC 13-1-2

Sec. 11. (a) General.

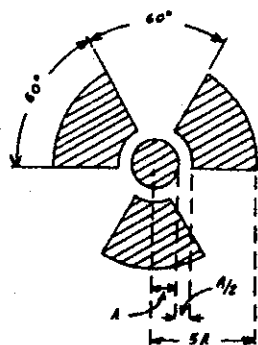
(1) Except as otherwise authorized by the board, symbols prescribed by 410 IAC 5-4-11 shall use the conventional radiation caution colors (magenta or purple on yellow background). The

² For determining the doses specified in 410 IAC 5-4-5, a dose from x or gamma radiation up to 10 MeV may be assumed to be equivalent to the exposure measured by a properly calibrated appropriate instrument in air at or near the body surface in the region of the highest dose rate.

³ It is the intent of 410 IAC 5-4-6 to limit radiation levels so that it is unlikely that individuals in unrestricted areas would receive a dose to the whole body in excess of 0.5 rem in any one year. If in specific instances, it is determined by the board that this intent is not met, the board may, pursuant to 410 IAC 5-1-7, impose such additional requirements on the licensee or registrant as may be necessary to meet the intent.

⁴ After July 1, 1984, all required personnel monitoring equipment must be obtained from personnel dosimetry processors having an accreditation program approved by the National Voluntary Laboratory Accreditation Program (NVLAP) of the National Bureau of Standards.

symbol prescribed by this section is the conventional three-blade design:



RADIATION SYMBOL

(A) Cross-hatch area is to be magenta or purple.

(B) Background is to be yellow.

(2) In addition to the contents of signs and labels prescribed in this section, a licensee or registrant may provide on or near such signs and labels any additional information which may be appropriate in aiding individuals to minimize exposure to radiation.

(b) Radiation Areas. Each radiation area shall be conspicuously posted with a sign or signs bearing the radiation caution symbol and the words:

CAUTION⁵
RADIATION AREA

(c) High Radiation Areas.

(1) Each high radiation area shall be conspicuously posted with a sign or signs bearing the radiation caution symbol and the words:

CAUTION⁶
HIGH RADIATION AREA

(2) Each entrance or access point to a high radiation area shall be:

(i) Equipped with a control device which shall cause the level of radiation to be reduced below that at which an individual might receive a dose of 100 millirems in 1 hour upon entry into the area; or

(ii) Equipped with a control device which shall energize a conspicuous visible or audible alarm signal in such a manner that the individual entering the high radiation area and the licensee or a supervisor of the activity are made aware of the entry; or

(iii) Maintained locked except during periods when access to the area is required, with positive control over each individual entry.

(3) The controls required by 410 IAC 5-4-11(c)(2) shall be established in such a way that no individual will be prevented from leaving a high radiation area.

(4) In the case of a high radiation area established for a period of 30 days or less, direct surveillance to prevent unauthorized entry may be substituted for the controls required by 410 IAC 5-4-11(c)(2).

(5) Any licensee or registrant may apply to the board for approval of methods not included in 410 IAC 5-4-11(c)(2) and (4) for controlling access to high radiation areas. The board will approve the proposed alternatives if the licensee or registrant demonstrates that the alternative methods of control will prevent unauthorized entry into a high radiation area, and that the requirement of 410 IAC 5-4-11(c)(3) is met.

(6) Each area in which there may exist radiation levels in excess of 500 rems in 1 hour at 1 meter from a sealed radioactive source that is used to irradiate materials shall have entry control devices and alarms meeting the criteria specified in Section 20.203(c)(6) of 10 CFR Part 20.

(7) The requirements of 410 IAC 5-4-11(c)(6) shall not apply to radioactive sources that are used in teletherapy, industrial radiography, or in completely self-contained irradiators. In the case of open field irradiators in which certain of the criteria specified in 410 IAC 5-4-11(c)(6) are impracticable, equivalent protection shall be provided by license conditions.

(d) Airborne Radioactivity Areas. Each airborne radioactivity area shall be conspicuously posted with a sign or signs bearing the radiation caution symbol and the words:

CAUTION⁷
AIRBORNE RADIOACTIVITY AREA

(e) Additional Requirements.

(1) Each area or room in which any radioactive material, other than natural uranium or thorium, is used or stored in an amount exceeding 10 times the quantity of radioactive material specified in Appendix B, 410 IAC 5-4-28, shall be conspicuously posted with a sign or signs bearing the radiation caution symbol and the words:

CAUTION⁸
RADIOACTIVE MATERIAL

(2) Each area or room in which natural uranium or thorium is used or stored in an amount exceeding 100 times the quantity specified in Appendix B, 410 IAC 5-4-28, shall be conspicuously posted with a sign or signs bearing the radiation caution symbol and the words:

CAUTION⁹
RADIOACTIVE MATERIAL

(f) Containers.

(1) Except as provided in 410 IAC 5-4-11(f)(3) each container of radioactive material shall bear a durable, clearly visible label identifying the radioactive contents.

⁵ Or "Danger."

⁶ Or "Danger."

⁷ Or "Danger."

⁸ Or "Danger."

⁹ Or "Danger."

(2) A label required pursuant to 410 IAC 5-4-11(f)(1) shall bear the radiation caution symbol and the words:

CAUTION¹⁰

RADIOACTIVE MATERIAL

It shall also provide sufficient information¹¹ to permit individuals handling or using the containers, or working in the vicinity thereof, to take precautions to avoid or minimize exposures.

(3) Notwithstanding the provisions of 410 IAC 5-4-11(f)(1) labeling is not required:

(i) For containers that do not contain radioactive material in quantities greater than the applicable quantities listed in Appendix B, 410 IAC 5-4-28;

(ii) For containers containing only natural uranium or thorium in quantities no greater than 10 times the applicable quantities listed in Appendix B, 410 IAC 5-4-28;

(iii) For containers that do not contain radioactive material in concentrations greater than the applicable concentrations listed in Appendix A, 410 IAC 5-4-27, Table I, Column 2;

(iv) For containers when they are attended by an individual who takes the precautions necessary to prevent the exposure of any individual to radiation or radioactive material in excess of the limits established by 410 IAC 5-4;

(v) For containers when they are in transport and packaged and labeled in accordance with regulations published by the U.S. Department of Transportation;

(vi) For containers which are accessible only to individuals authorized to handle or use them¹² or to work in the vicinity thereof, provided that the contents are identified to such individuals by a readily available written record; and

(vii) For manufacturing and process equipment such as piping and tanks.

(4) Each licensee or registrant shall, prior to disposal of an empty uncontaminated container to unrestricted areas, remove or deface the radioactive material label or otherwise clearly indicate that the container no longer contains radioactive material.

(g) All radiation machines shall be labeled in a manner which cautions individuals that radiation is produced when the machine is being operated.

(Indiana State Department of Health; Rule HRH-2, PT D, Sec D.203; filed May 26, 1978, 3:30 pm: 1 IR 178; filed Feb 29, 1984, 10:10 am: 7 IR 903)

Cited in: 410 IAC 5-3-13; 410 IAC 5-4-12; 410 IAC 5-4-28; 410 IAC 5-5-11.5; 410 IAC 5-5-15; 410 IAC 5-5-16; 410 IAC 5-7-2; 410 IAC 5-8-3; 410 IAC 5-8-4; 410 IAC 5-9-8.

410 IAC 5-4-12 Exceptions to posting requirements

Authority: IC 13-1-2-9; IC 13-1-2-11; IC 16-1-3-13

Affected: IC 13-1-2

Sec. 12. Notwithstanding the provisions of 410 IAC 5-4-11:

(a) A room or area is not required to be posted with a caution sign because of the presence of a sealed source, provided the radiation level 12 inches from the surface of the source container or housing does not exceed 5 millirem per hour.

(b) Rooms or other areas in hospitals are not required to be posted with caution signs, and control of entrance or access thereto pursuant to 410 IAC 5-4-11(c) is not required, because of the presence of patients containing radioactive material provided that there are personnel in attendance who will take the precautions necessary to prevent the exposure of any individual to radiation or radioactive material in excess of the limits established in 410 IAC 5-4.

(c) Caution signs are not required to be posted in areas or rooms containing radioactive material for periods of less than 8 hours provided that (1) the material is constantly attended during such periods by an individual who shall take the precautions necessary to prevent the exposure of any individual to radiation or radioactive material in excess of the limits established in 410 IAC 5-4, and (2) such area or room is subject to the licensee's or registrant's control.

(d) A room or other area is not required to be posted with a caution sign, and control is not required for each entrance or access point to a room or other area which is a high radiation area solely because of the presence of radioactive material prepared for transport and packaged and labeled in accordance with regulations of the U.S. Department of Transportation.

(Indiana State Department of Health; Rule HRH-2, PT D, Sec D.204; filed May 26, 1978, 3:30 pm: 1 IR 180; filed Feb 29, 1984, 10:10 am: 7 IR 904)
Cited in: 410 IAC 5-5-16; 410 IAC 5-7-2.

410 IAC 5-4-13 Instruction of personnel

Authority: IC 13-1-2-9; IC 13-1-2-11; IC 16-1-3-13

Affected: IC 13-1-2

Sec. 13. Instructions required for individuals working in or frequenting any portion of a restricted area are specified in 410 IAC 5-10-3.

(Indiana State Department of Health; Rule HRH-2, PT D, Sec D.205; filed May 26, 1978, 3:30 pm: 1 IR 180; filed Feb 29, 1984, 10:10 am: 7 IR 905)

410 IAC 5-4-14 Storage of radiation sources

Authority: IC 13-1-2-9; IC 13-1-2-11; IC 16-1-3-13

Affected: IC 13-1-2

Sec. 14. (a) Sources of radiation shall be secured against unauthorized removal from the place of storage.

(b) Sources of radiation in an unrestricted area and not in storage shall be tended under the constant surveillance and immediate control of the licensee or registrant.

(Indiana State Department of Health; Rule HRH-2, PT D, Sec D.206; filed May 26, 1978, 3:30 pm: 1 IR 180; filed Feb 29, 1984, 10:10 am: 7 IR 905)

410 IAC 5-4-21 Recordkeeping requirements

Authority: IC 13-1-2-9; IC 13-1-2-11; IC 16-1-3-13

Affected: IC 13-1-2

Sec. 21. (a) Each licensee or registrant shall maintain records showing the radiation exposures of all individuals for whom

¹⁰ Or "Danger."

¹¹ As appropriate, the information will include radiation levels, kinds of material, estimate of activity, date for which activity is estimated, etc.

¹² For example, containers in locations such as water-filled canals, storage vaults, or hot cells.

personnel monitoring is required under 410 IAC 5-4-10. Such records shall be kept on board form "Z", in accordance with the instructions contained in that form, or on clear and legible records containing all the information required by board form "Z". The doses entered on the forms or records shall be for periods of time not exceeding 1 calendar quarter.

(b) Each licensee or registrant shall maintain records in the same units used in 410 IAC 5-4, showing the results of surveys required by 410 IAC 5-4-9, monitoring required by 410 IAC 5-4-15(b) and (c), and disposals made under 410 IAC 5-4-17, 410 IAC 5-4-18, and 410 IAC 5-4-19.

(c)(1) Records of individual exposure to radiation and to radioactive material which must be maintained pursuant to the provisions of 410 IAC 5-4-21(a) and records of bioassays, including results of whole body counting examinations, made pursuant to 410 IAC 5-4-8 shall be preserved until the board authorizes their disposition.

(2) Records of the results of surveys and monitoring which must be maintained pursuant to 410 IAC 5-4-21(b) shall be preserved for 2 years after the completion of the survey except that the following records shall be maintained until the board authorizes their disposition:

(i) records of the results of surveys to determine compliance with 410 IAC 5-4-4(a);

(ii) in the absence of personnel monitoring data, records of the results of surveys to determine external radiation dose; and

(iii) records of the results of surveys used to evaluate the release of radioactive effluents to the environment.

(3) Records of disposal of licensed material made pursuant to 410 IAC 5-4-17, 410 IAC 5-4-18 or 410 IAC 5-4-19 shall be maintained until the board authorizes their disposition.

(4) Records which must be maintained pursuant to 410 IAC 5-4-21 may be the original or a reproduced copy or microform if such reproduced copy or microform is duly authenticated by authorized personnel and the microform is capable of producing a clear and legible copy after storage for the period specified by board rules.

(5) If there is a conflict between the board's rules in 410 IAC 5-4-21, license condition, or other written board approval or authorization pertaining to the retention period for the same type of record, the retention period specified in the rules in 410 IAC 5-4-21 for such records shall apply unless the board, pursuant to 410 IAC 5-1-3(a), has granted a specific exemption from the record retention requirements specified in 410 IAC 5-4-21.

(d) The discontinuance of, or curtailment of, activities does not relieve the licensee or registrant of responsibility for retaining all records required by 410 IAC 5-4-21. A licensee or registrant may, however, request the board to accept such records. The acceptance of the records by the board relieves the licensee or registrant of subsequent responsibility only in respect to their preservation as required by 410 IAC 5-4-21.

(Indiana State Department of Health; Rule HRH-2, PT D, Sec D.401; filed May 26, 1978, 3:30 pm: 1 IR 182; filed Feb 29, 1984, 10:10 am: 7 IR 908)
Cited in: 410 IAC 5-10-4.

410 IAC 5-4-22 Theft or loss of sources; reporting

Authority: IC 13-1-2-9; IC 13-1-2-11; IC 16-1-3-13

Affected: IC 13-1-2

Sec. 22. Each licensee or registrant shall report by telephone or mailgram to the board the theft or loss of any source of radiation immediately after such occurrence becomes known.

(Indiana State Department of Health; Rule HRH-2, PT D, Sec D.402; filed May 26, 1978, 3:30 pm: 1 IR 182; filed Feb 29, 1984, 10:10 am: 7 IR 908)
Cited in: 410 IAC 5-3-7; 410 IAC 5-3-31.

410 IAC 5-4-23 Incident reports

Authority: IC 13-1-2-9; IC 13-1-2-11; IC 16-1-3-13

Affected: IC 13-1-2

Sec. 23. (a) Immediate Notification. Each licensee or registrant shall immediately notify the board by telephone and telegraph of any incident involving any source of radiation possessed by him and which may have caused or threatens to cause:

(1) a dose to the whole body of any individual of 25 rems or more of radiation; a dose to the skin of the whole body of any individual of 150 rems or more of radiation; or a dose to the feet, ankles, hands, or forearms of any individual of 375 rems or more of radiation; or

(2) the release of radioactive material in concentrations which, if averaged over a period of 24 hours, would exceed 5,000 times the limits specified for such materials in Appendix A, 410 IAC 5-4-27, Table II; or

(3) a loss of 1 working week or more of the operation of any facilities affected; or

(4) damage to property in excess of \$200,000.

(b) Twenty-four Hour Notification. Each licensee or registrant shall within 24 hours notify the board by telephone or mailgram of any incident involving any source of radiation possessed by him and which may have caused or threatens to cause:

(1) A dose to the whole body of any individual of 5 rems or more of radiation; a dose to the skin of the whole body of any individual of 30 rems or more of radiation; or a dose to the feet, ankles, hands, or forearms of 75 rems or more of radiation; or

(2) The release of radioactive material in concentrations which, if averaged over a period of 24 hours, would exceed 500 times the limits specified for such materials in Appendix A, 410 IAC 5-4-27, Table II; or

(3) A loss of 1 day or more of the operation of any facilities affected; or

(4) Damage to property in excess of \$2,000.

(c) Any report filed with the board pursuant to 410 IAC 5-4-23 shall be prepared in such a manner that names of individuals who have received excessive doses will be stated in a separate part of the report.

(Indiana State Department of Health; Rule HRH-2, PT D, Sec D.403; filed May 26, 1978, 3:30 pm: 1 IR 182; filed Feb 29, 1984, 10:10 am: 7 IR 909)
Cited in: 410 IAC 5-3-7; 410 IAC 5-3-31; 410 IAC 5-4-24.

410 IAC 5-4-24 Overexposure reports

Authority: IC 13-1-2-9; IC 13-1-2-11; IC 16-1-3-13

Affected: IC 13-1-2

Sec. 24. (a) In addition to any notification required by 410 IAC 5-4-23, each licensee or registrant shall make a report in writing within 30 days to the board of:

(1) each exposure of an individual to radiation in excess of the applicable standards in 410 IAC 5-4-2 or 410 IAC 5-4-5(a) or the license;

(2) each exposure of an individual to radioactive material in excess of the applicable limits in 410 IAC 5-4-4(a)(1), 410 IAC 5-4-4(a)(2), 410 IAC 5-4-5(b) or the license;

(3) levels of radiation or concentrations of radioactive material in a restricted area in excess of any other applicable limit in the license;

(4) any incident for which notification is required by 410 IAC 5-4-23; and

(5) levels of radiation or concentrations of radioactive material, whether or not involving excessive exposure of any individual, in an unrestricted area in excess of 10 times any applicable limit set forth in this part [410 IAC 5-4] or in the license.

(b) Each report required under 410 IAC 5-4-24 shall describe the extent of exposure of individuals to radiation or to radioactive material, including estimates of each individual's exposure as required by 410 IAC 5-4-24; levels of radiation and concentrations of radioactive material involved; the cause of the exposure, levels or concentrations; and corrective steps taken or planned to assure against a recurrence.

(c) Any report filed with the board pursuant to 410 IAC 5-4-24 shall include for each individual exposed the name, social security number, and the date of birth, and an estimate of the individual's dose. The report shall be prepared so that this information is stated in a separate part of the report.

(Indiana State Department of Health; Rule HRH-2,PT D,Sec D.405; filed May 26, 1978, 3:30 pm: 1 IR 183; filed Feb 29, 1984, 10:10 am: 7 IR 909)
Cited in: 410 IAC 5-4-26; 410 IAC 5-10-4.

410 IAC 5-4-26 Notice and report to exposed individuals

Authority: IC 13-1-2-9; IC 13-1-2-11; IC 16-1-3-13

Affected: IC 13-1-2

Sec. 26. (a) Requirements for notification and reports to individuals of exposure to radiation or radioactive material are specified in 410 IAC 5-10-4.

(b) When a licensee or registrant is required pursuant to 410 IAC 5-4-24 to report to the board any exposure of an individual to radiation or radioactive material, the licensee or registrant shall also notify the individual. Such notice shall be transmitted at a time not later than the transmittal to the board, and shall comply with the provisions of 410 IAC 5-10-4(a).

(Indiana State Department of Health; Rule HRH-2,PT D,Sec D.408; filed May 26, 1978, 3:30 pm: 1 IR 183; filed Feb 29, 1984, 10:10 am: 7 IR 910)

Rule 5. Non-Medical Radiography

Cited in: 410 IAC 5-3-2; 410 IAC 5-5-1; 410 IAC 5-5-2; 410 IAC 5-5-3; 410 IAC 5-5-3.2; 410 IAC 5-9-1.

410 IAC 5-5-1 Scope of rule

Authority: IC 13-1-2-9; IC 13-1-2-11; IC 16-1-3-13

Affected: IC 13-1-2

Sec. 1. The requirements in 410 IAC 5-5 establish radiation safety requirements for persons utilizing sources of radiation for non-medical radiography (i.e., industrial radiography, ionizing radiation gauging devices, NARM, and any other non-medical use). The requirements of 410 IAC 5-5 are in addition to, and not in substitution for, the other requirements of 410 IAC 5.

(Indiana State Department of Health; Rule HRH-2,PT E,Sec E.1; filed May 26, 1978, 3:30 pm: 1 IR 199; filed Feb 29, 1984, 10:10 am: 7 IR 926)

410 IAC 5-5-2 Applicability of rule

Authority: IC 13-1-2-9; IC 13-1-2-11; IC 16-1-3-13

Affected: IC 13-1-2

Sec. 2. The requirements in 410 IAC 5-5 apply to all registrants who use sources of radiation for non-medical radiography. Except for those requirements of 410 IAC 5-5 clearly applicable only to sealed radioactive sources, both radiation machines and sealed radioactive sources are covered by 410 IAC 5-5.

(Indiana State Department of Health; Rule HRH-2,PT E,Sec E.2; filed May 26, 1978, 3:30 pm: 1 IR 199; filed Feb 29, 1984, 10:10 am: 7 IR 927)

410 IAC 5-5-3 Definitions

Authority: IC 13-1-2-9; IC 13-1-2-11; IC 16-1-3-13

Affected: IC 13-1-2

Sec. 3. As used in 410 IAC 5-5, the following definitions apply:

"ANSI" means the American National Standards Institute.

"Enclosed radiography" means industrial radiography conducted in an enclosed cabinet or room and includes cabinet radiography and shielded room radiography.

(1) "Cabinet radiography" means industrial radiography conducted in an enclosure or cabinet so shielded that every location on the exterior meets the limitations specified in 410 IAC 5-4-6.

(i) "Cabinet x-ray system" means an x-ray system with the x-ray tube installed in an enclosure (hereinafter termed "cabinet") which, independent of existing architectural structures except the floor on which it may be placed, is intended to contain at least that portion of a material being irradiated, provide radiation attenuation, and exclude personnel from its interior during generation of x-radiation. Included are all x-ray systems designed primarily for the inspection of carry-on baggage at airlines, railroads, bus terminals, and in similar facilities. An x-ray tube used within a shielded part of a building, or x-ray equipment which may temporarily or occasionally incorporate portable shielding is not considered a cabinet x-ray system.

(ii) "Certified cabinet x-ray system" means an x-ray system which has been certified in accordance with 21 CFR 1010.2 as being manufactured and assembled pursuant to the provisions of 21 CFR 1020.40.

(2) "Shielded-room radiography" means industrial radiography conducted in a room so shielded that radiation levels at every location on the exterior meet the limitations specified in 410 IAC 5-4-6.

"Gamma radiography" means industrial radiography using radioactive material that emits gamma rays (i.e., Ir 192, Co 60, Cs 137).

"Industrial radiography" means the use of penetrating radiation, such as x-rays, gamma rays, or neutrons, to make pictures of the insides of objects (i.e., metal castings or welds).

"Ionizing radiation gauging device" (gauge) means a mechanism designed and manufactured for the purpose of determining or controlling thickness, density, level, interface location, or qualitative or quantitative chemical composition.

"NARM" means any naturally occurring or accelerator produced radioactive material. It does not include by-product, source, or special nuclear material.

"Permanent radiographic installation" means an installation or structure designed or intended for radiography and in which radiography is regularly performed.

"Personal supervision" means supervision such that the supervisor is physically present at the site where sources of radiation and associated equipment are being used, watching the performance of the radiographer's assistant and in such proximity that contact can be maintained and immediate assistance given as required.

"Radiographer" means any individual who performs or provides personal supervision of industrial radiographic operations and who is responsible to the licensee or registrant for assuring compliance with the requirements of 410 IAC 5 and all license (and/or registration) conditions.

"Radiographer's assistant" means any individual who, under the personal supervision of a radiographer, uses sources of radiation, related handling tools, or radiation survey instruments in industrial radiography.

"Radiographic exposure device" means any instrument containing a sealed source fastened or contained therein, in which the sealed source or shielding thereof may be moved, or otherwise changed, from a shielded to unshielded position for purposes of making a radiographic exposure.

"Shielded position" means the location within the radiographic exposure device or storage container which, by manufacturer's design, is the proper location for storage of the sealed source.

"Source changer" means a device designed and used for replacement of sealed sources in radiographic exposure devices, including those source changers also used for transporting and storage of sealed sources.

"Storage container" means a device in which sealed sources are transported or stored.

"Temporary job site" means any location where industrial radiography is performed other than the location(s) listed in a specific license or certificate of registration.

(Indiana State Department of Health; Rule HRH-2, PT E, Sec E.3; filed May 26, 1978, 3:30 pm: 1 IR 199; filed Feb 29, 1984, 10:10 am: 7 IR 927)

410 IAC 5-5-3.1 Additional requirements; safety programs

Authority: IC 13-1-2-9; IC 13-1-2-11; IC 16-1-3-13

Affected: IC 13-1-2

Sec. 3.1. (a) Ionizing radiation gauging devices shall comply with applicable sections of ANSI N538 or its equivalent, in addition to 410 IAC 5-5-8 and other applicable sections of 410 IAC 5.

(b) The board may impose any additional requirement for the specific application of an ionizing radiation source to protect the health and safety of an employee and/or the public. The board shall weigh the impact of any such requirement against the hazards created without such a requirement, before imposing any additional requirements.

(c) All non-medical users of "NARM" and/or devices that produce x-rays either as part of their design or incidental to other design functions shall have an adequate radiation safety program.

(1) The adequacy of the program will be evaluated by the board.

(2) The program must meet the intent of 410 IAC 5.

(3) The program shall keep personnel exposure ALARA (as low as reasonably achievable).

(4) The program shall take under consideration the education and training of the personnel utilizing or in the environs of the radiation device.

(Indiana State Department of Health; 410 IAC 5-5-3.1; filed Feb 29, 1984, 10:10 am: 7 IR 928)

410 IAC 5-5-3.2 Enclosed radiography; special provisions and exemptions

Authority: IC 13-1-2-9; IC 13-1-2-11; IC 16-1-3-13

Affected: IC 13-1-2

Sec. 3.2. (a) Systems for enclosed radiography designed to allow admittance of individuals shall:

(1) Comply with 410 IAC 5-5-11, 410 IAC 5-5-11.5, 410 IAC 5-5-12, 410 IAC 5-5-13, 410 IAC 5-5-15, 410 IAC 5-5-16, and 410 IAC 5-5-18 of 410 IAC 5-5 and 410 IAC 5-4-6.

(2) Operating personnel must be provided with either a film badge or a thermoluminescent dosimeter and reports of the results must be maintained for inspection by the board.

(3) Be evaluated at intervals not to exceed 1 year to assure compliance with the applicable requirements as specified in 410 IAC 5-5-3.2(a)(1). Records of these evaluations shall be maintained for inspection by the board for a period of 2 years after the evaluation.

(b) Cabinet x-ray systems designed to exclude individuals are exempt from the requirements of 410 IAC 5-5-3.2 except that:

(1) No registrant shall permit any individual to operate a cabinet x-ray system until such individual has received a copy of instructions in the operating procedures for the unit and has demonstrated competence in its use. Records which demonstrate compliance with this subdivision shall be maintained for inspection by the board until disposition is authorized by the board;

(2) Tests for proper operation of high radiation area control devices or alarm systems, where applicable, must be conducted and recorded in accordance with 410 IAC 5-5-11.5; and

(3) The registrant shall perform or have done an evaluation, at intervals not to exceed 1 year, to determine

conformance with 410 IAC 5-4-6. If such a system is a certified cabinet x-ray system, it shall be evaluated at intervals not to exceed 1 year to determine conformance with 21 CFR 1020.40. Records of these evaluations shall be maintained for inspection by the board for a period of 2 years after the evaluation.

(c) Certified cabinet x-ray systems shall be maintained in compliance with 21 CFR 1020.40 unless prior approval has been granted by the board pursuant to 410 IAC 5-1-3(a).

(Indiana State Department of Health; 410 IAC 5-5-3.2; filed Feb 29, 1984, 10:10 am: 7 IR 928)

410 IAC 5-5-4 Radiation limits for exposure devices and storage containers for gamma radiography

Authority: IC 13-1-2-9; IC 13-1-2-11; IC 16-1-3-13

Affected: IC 13-1-2

Sec. 4. Radiographic exposure devices measuring less than 10 cm from the sealed source storage position to any exterior surface of the device shall have no radiation level in excess of 50 milliroentgens per hour at 15 cm from any exterior surface of the device. Radiographic exposure devices measuring a minimum of 10 cm from the sealed source storage position to any exterior surface of the device, and all storage containers for sealed sources or outer containers for radiographic exposure devices, shall have no radiation level in excess of 200 milliroentgens per hour at any exterior surface, and 10 milliroentgens per hour at 1 meter from any exterior surface. The radiation levels specified are with the sealed source in the shielded (i.e., "off") position.

(Indiana State Department of Health; Rule HRH-2, PT E, Sec E.101; filed May 26, 1978, 3:30 pm: 1 IR 200; filed Feb 29, 1984, 10:10 am: 7 IR 929)

410 IAC 5-5-5 Locking of sources for gamma radiography

Authority: IC 13-1-2-9; IC 13-1-2-11; IC 16-1-3-13

Affected: IC 13-1-2

Sec. 5. (a) Each source of radiation shall be provided with a lock or lockable outer container designed to prevent unauthorized or accidental production of radiation or removal or exposure of a sealed source and shall be kept locked at all times except when under the direct surveillance of a radiographer or radiographer's assistant, or as may be otherwise authorized pursuant to 410 IAC 5-5-15. Each storage container and source changer likewise shall be provided with a lock and shall be kept locked when containing sealed sources except when the container is under the direct surveillance of a radiographer or radiographer's assistant.

(b) Radiographic exposure devices, source changers, and storage containers, prior to being moved from one location to another and also prior to being secured at a given location, shall be locked and surveyed to assure that the sealed source is in the shielded position.

(Indiana State Department of Health; Rule HRH-2, PT E, Sec E.102; filed May 26, 1978, 3:30 pm: 1 IR 200; filed Feb 29, 1984, 10:10 am: 7 IR 929)
Cited in: 410 IAC 5-5-17.

410 IAC 5-5-6 Security precautions for gamma radiography

Authority: IC 13-1-2-9; IC 13-1-2-11; IC 16-1-3-13

Affected: IC 13-1-2

Sec. 6. Locked radiographic exposure devices, source changers, and storage containers shall be physically secured to prevent tampering or removal by unauthorized personnel.

(Indiana State Department of Health; Rule HRH-2, PT E, Sec E.103; filed May 26, 1978, 3:30 pm: 1 IR 200; filed Feb 29, 1984, 10:10 am: 7 IR 929)

410 IAC 5-5-7 Survey instruments for gamma and temporary job site radiography

Authority: IC 13-1-2-9; IC 13-1-2-11; IC 16-1-3-13

Affected: IC 13-1-2

Sec. 7. (a) The licensee or registrant shall maintain sufficient calibrated and operable radiation survey instruments to make physical radiation surveys as required by 410 IAC 5-5-7 and 410 IAC 5-4-9 of 410 IAC 5. Instrumentation required by this section shall have such a range such that 2 milliroentgens per hour through 1 roentgen per hour can be measured.

(b) Each radiation survey instrument shall be calibrated:

(1) at energies appropriate for use and at intervals not to exceed 3 months and after each instrument servicing;

(2) such that accuracy within plus or minus 20 percent traceable to a national standard can be demonstrated; and

(3) at two or more widely separated points, other than zero, on each scale.

(c) Records of these calibrations shall be maintained for two years after the calibration date for inspection by the board.

(Indiana State Department of Health; Rule HRH-2, PT E, Sec E.104; filed May 26, 1978, 3:30 pm: 1 IR 200; filed Feb 29, 1984, 10:10 am: 7 IR 929)

410 IAC 5-5-8 Leak testing, replacement, and modification of NARM sealed sources

Authority: IC 13-1-2-9; IC 13-1-2-11; IC 16-1-3-13

Affected: IC 13-1-2

Sec. 8. (a) The replacement of any "NARM" sealed source fastened to or contained in a radiographic exposure device and leak testing, repair, tagging, opening or any other modification of any sealed source shall be performed only by persons qualified by education and training.

(b) Each sealed source shall be tested for leakage at intervals not to exceed 6 months. In the absence of a certificate from a transferor that a test has been made within the 6 month period prior to the transfer, the sealed source shall not be put into use until tested.

(1) The board may grant exceptions to the leak test requirement for "NARM," when;

(i) The construction and history of a type of sealed source warrants a less frequent testing.

(ii) Access to the source places an undue burden on the registrant.

(2) Any "NARM" sealed source less than 100 times the quantity listed in Schedule B of 410 IAC 5-4 is excepted from leak tests.

(3) Any sealed source with a half-life less than 30 days and/or in gaseous form is excepted from leak tests.

(4) Any "NARM" sealed source 10 μ Ci or less used as a check source is excepted.

(c) The leak test shall be capable of detecting the presence of 0.005 microcurie of removable contamination on the sealed source. An acceptable leak test for sealed sources in the possession of a radiography licensee would be to test at the nearest accessible point to the sealed source storage position, or other appropriate measuring point. Records of leak test results shall be kept in units of microcuries and maintained for inspection by the board for 6 months after the next required leak test is performed or until the sealed source is transferred or disposed of.

(d) Any test conducted pursuant to 410 IAC 5-5-8(b) and (c) which reveals the presence of 0.005 microcurie or more of removable radioactive material shall be considered evidence that the sealed source is leaking. The licensee shall immediately withdraw the equipment involved from use and shall cause it to be decontaminated and repaired or to be disposed of, in accordance with rules of the board. Within 5 days after obtaining results of the test, the licensee shall file a report with the board describing the equipment involved, the test results, and the corrective action taken.

(e) A sealed source which is not fastened to or contained in a radiographic exposure device shall have permanently attached to it a durable tag bearing the prescribed radiation caution symbol in conventional colors, magenta or purple on a yellow background, and at least the instructions: "Danger)Radioactive Material."

(Indiana State Department of Health; Rule HRH-2,PT E,Sec E.105; filed May 26, 1978, 3:30 pm: 1 IR 200; filed Feb 29, 1984, 10:10 am: 7 IR 930)
Cited in: 410 IAC 5-5-3.1.

410 IAC 5-5-9 Quarterly inventory of sealed sources for gamma radiography

Authority: IC 13-1-2-9; IC 13-1-2-11; IC 16-1-3-13
Affected: IC 13-1-2

Sec. 9. Each licensee shall conduct a quarterly physical inventory to account for all sealed sources received or possessed by him. The records of the inventories shall be maintained for 2 years from the date of the inventory for inspection by the board and shall include the quantities and kinds of radioactive material, the location of sealed sources, and the date of the inventory.

(Indiana State Department of Health; Rule HRH-2,PT E,Sec E.106; filed May 26, 1978, 3:30 pm: 1 IR 201; filed Feb 29, 1984, 10:10 am: 7 IR 930)
Cited in: 410 IAC 5-5-17.

410 IAC 5-5-10 Utilization logs in gamma radiography

Authority: IC 13-1-2-9; IC 13-1-2-11; IC 16-1-3-13
Affected: IC 13-1-2

Sec. 10. Each licensee or registrant shall maintain current logs, which shall be kept available for inspection by the board for 2 years from the date of the recorded event showing for each source of radiation the following information:

(a) A description (or make and model number) of each source of radiation or storage container in which the sealed source is located;

(b) The identity of the radiographer to whom assigned; and

(c) Locations where used and dates of use.

(Indiana State Department of Health; Rule HRH-2,PT E,Sec E.107; filed May 26, 1978, 3:30 pm: 1 IR 201; filed Feb 29, 1984, 10:10 am: 7 IR 930)

410 IAC 5-5-11 Inspection and maintenance of industrial exposure devices and storage containers

Authority: IC 13-1-2-9; IC 13-1-2-11; IC 16-1-3-13
Affected: IC 13-1-2

Sec. 11. (a) Each licensee or registrant shall ensure that checks for obvious defects in radiation machines, radiographic exposure devices, storage containers, and source changers are performed prior to each day of use.

(b) The licensee or registrant shall conduct a program of at least quarterly inspection and maintenance of radiation machines, radiographic exposure devices, storage containers, and source changers to assure proper functioning of components important to safety. All appropriate parts shall be maintained in accordance with manufacturers' specifications. Records of inspection and maintenance shall be maintained for inspection by the board until it authorizes their disposal.

(c) If any inspection conducted pursuant to 410 IAC 5-5-11(a) or (b) reveals damage to components critical to radiation safety, the device shall be removed from service until repairs have been made.

(Indiana State Department of Health; Rule HRH-2,PT E,Sec E.108; filed May 26, 1978, 3:30 pm: 1 IR 201; filed Feb 29, 1984, 10:10 am: 7 IR 931)
Cited in: 410 IAC 5-5-3.2.

410 IAC 5-5-11.5 Permanent installations

Authority: IC 13-1-2-9; IC 13-1-2-11; IC 16-1-3-13
Affected: IC 13-1-2

Sec. 11.5. Permanent radiographic installations having high radiation area entrance controls of the type described in 410 IAC 5-4-11(c)(2)(ii) and (jii) and (c)(4) shall also meet the following requirements:

(a) Each entrance that is used for personnel access to the high radiation area shall have both visible and audible warning signals to warn of the presence of radiation. The visible signal shall be activated by radiation. The audible signal shall be activated when an attempt is made to enter the installation while the source is exposed.

(b) The control device or alarm system shall be tested for proper operation at the beginning of each period of use. Records of these tests shall be maintained for inspection by the board until their disposal is authorized.

(Indiana State Department of Health; 410 IAC 5-5-11.5; filed Feb 29, 1984, 10:10 am: 7 IR 931)
Cited in: 410 IAC 5-5-3.2.

410 IAC 5-5-12 Personnel training and testing; internal audit of operating and emergency procedures

Authority: IC 13-1-2-9; IC 13-1-2-11; IC 16-1-3-13
Affected: IC 13-1-2

Sec. 12. Training and testing (applies to all industrial radiography).

(a) No licensee or registrant shall permit any individual to act as a radiographer, as defined in 410 IAC 5-5-12, until such individual:

(1) Has been instructed in the subjects outlined in 410 IAC 5-5-20 and shall have demonstrated understanding thereof;

(2) Has received copies of and instruction in the requirements contained in this section and the applicable sections of 410 IAC 5-4 and 410 IAC 5-10, appropriate license(s), and the licensee's or registrant's operating and emergency procedures, and shall have demonstrated understanding thereof;

(3) Has demonstrated competence to use the source of radiation, radiographic exposure devices, related handling tools, and radiation survey instruments which will be employed in his assignment; and

(4) Has demonstrated an understanding of the instructions of 410 IAC 5-5-12(a) by successful completion of a written test and a field examination on the subjects covered.

(b) No licensee or registrant shall permit any individual to act as a radiographer's assistant as defined in 410 IAC 5-5-12 until such individual:

(1) Has received copies of and instruction in the licensee's or registrant's operating and emergency procedures, and shall have demonstrated understanding thereof;

(2) Has demonstrated competence to use, under the personal supervision of the radiographer, the sources of radiation, radiographic exposure device(s), related handling tools, and radiation survey instruments which will be employed in his assignment; and

(3) Has demonstrated an understanding of the instructions in 410 IAC 5-5-12(b) by successful completion of a written or oral test and a field examination on the subjects covered.

(c) Records of the above training, including copies of written tests and dates of oral tests and field examinations, shall be maintained for inspection by the board for 3 years following termination of employment.

(d) Each licensee or registrant shall conduct an internal audit program to ensure that the board's radioactive material license conditions and the licensee's or registrant's operating and emergency procedures are followed by each radiographer and radiographer's assistant. These internal audits shall be performed at least quarterly, and each radiographer shall be audited at least annually. Records of internal audits shall be maintained for inspection by the board for 2 years from the date of the audit.

(Indiana State Department of Health; Rule HRH-2,PT E,Sec E.201; filed May 26, 1978, 3:30 pm; 1 IR 201; filed Feb 29, 1984, 10:10 am; 7 IR 931)
Cited in: 410 IAC 5-5-3.2.

410 IAC 5-5-13 Operating and emergency instructions

Authority: IC 13-1-2-9; IC 13-1-2-11; IC 16-1-3-13

Affected: IC 13-1-2

Sec. 13. The licensee's or registrant's operating and emergency procedures shall include instructions in at least the following:

(a) The handling and use of sources of radiation to be employed such that no individual is likely to be exposed to radiation doses in excess of the limits established in 410 IAC 5-4;

(b) Methods and occasions for conducting radiation surveys;

(c) Methods for controlling access to radiographic areas;

(d) Methods and occasions for locking and securing sources of radiation;

(e) Personnel monitoring and the use of personnel monitoring equipment including steps that must be taken immediately by radiography personnel in the event a pocket dosimeter is found to be off-scale;

(f) Transportation to field locations, including packing of sources of radiation in the vehicles, posting of vehicles, and control of sources of radiation during transportation;

(g) Minimizing exposure of individuals in the event of an accident;

(h) The procedure for notifying proper personnel in the event of an accident;

(i) Maintenance of records; and

(j) The inspection and maintenance of radiographic exposure devices, source changers, storage containers, and radiation machines.

(Indiana State Department of Health; Rule HRH-2,PT E,Sec E.202; filed May 26, 1978, 3:30 pm; 1 IR 201; filed Feb 29, 1984, 10:10 am; 7 IR 932)
Cited in: 410 IAC 5-5-11; 410 IAC 5-5-3.2.

410 IAC 5-5-14 Personnel monitoring in gamma radiography

Authority: IC 13-1-2-9; IC 13-1-2-11; IC 16-1-3-13

Affected: IC 13-1-2

Sec. 14. (a) No licensee or registrant shall permit any individual to act as a radiographer or as a radiographer's assistant unless, at all times during radiographic operations, each such individual shall wear a direct reading pocket dosimeter and either film badge or a thermoluminescent dosimeter. Pocket dosimeters shall have a range from zero to at least 200 milliroentgens and shall be recharged daily or at the start of each shift. Each film badge or thermoluminescent dosimeter shall be assigned to and worn by only one individual.

(b) Pocket dosimeters shall be read and exposures recorded daily. An individual's film badge or thermoluminescent dosimeter shall be immediately processed if his pocket dosimeter is discharged beyond its range. Reports received from the film badge or thermoluminescent dosimeter processor and records of pocket dosimeter readings shall be maintained for inspection by the board until it authorizes their disposal.

(c) Pocket dosimeters shall be checked for correct response to radiation at periods not to exceed one year. Acceptable dosimeters shall read within plus or minus 30 percent of the true radiation exposure.

(Indiana State Department of Health; Rule HRH-2,PT E,Sec E.203; filed May 26, 1978, 3:30 pm; 1 IR 202; filed Feb 29, 1984, 10:10 am; 7 IR 932)

410 IAC 5-5-14.5 Supervision of radiographer assistants in gamma radiography

Authority: IC 13-1-2-9; IC 13-1-2-11; IC 16-1-3-13

Affected: IC 13-1-2

Sec. 14.5. Whenever a radiographer's assistant uses radiographic exposure devices, sealed sources, or related source handling tools, or conducts radiation surveys required by 410 IAC 5-5-17(b) and (c) to determine that the sealed source has

returned to the shielded position after an exposure, the radiographer's assistant shall be under the personal supervision of a radiographer.

(Indiana State Department of Health; 410 IAC 5-5-14.5; filed Feb 29, 1984, 10:10 am: 7 IR 933)

410 IAC 5-5-15 Security during operation

Authority: IC 13-1-2-9; IC 13-1-2-11; IC 16-1-3-13

Affected: IC 13-1-2

Sec. 15. During each radiographic operation, the radiographer or radiographer's assistant shall maintain a direct surveillance of the operation to protect against unauthorized entry into a high radiation area, as defined in 410 IAC 5-1, except:

- (a) Where the high radiation area is equipped with a control device or alarm system as described in 410 IAC 5-4-11(c)(2), or
- (b) Where the high radiation area is locked to protect against unauthorized or accidental entry.

(Indiana State Department of Health; Rule HRH-2, PT E, Sec E.301; filed May 26, 1978, 3:30 pm: 1 IR 202; filed Feb 29, 1984, 10:10 am: 7 IR 933)
Cited in: 410 IAC 5-5-3.2; 410 IAC 5-5-5.

410 IAC 5-5-16 Posting of operation areas

Authority: IC 13-1-2-9; IC 13-1-2-11; IC 16-1-3-13

Affected: IC 13-1-2

Sec. 16. Notwithstanding any provisions in 410 IAC 5-4-12(c), areas in which radiography is being performed shall be conspicuously posted as required by 410 IAC 5-4-11(b) and (c)(1).

(Indiana State Department of Health; Rule HRH-2, PT E, Sec E.302; filed May 26, 1978, 3:30 pm: 1 IR 202; filed Feb 29, 1984, 10:10 am: 7 IR 933)
Cited in: 410 IAC 5-5-3.2.

410 IAC 5-5-17 Surveys; records

Authority: IC 13-1-2-9; IC 13-1-2-11; IC 16-1-3-13

Affected: IC 13-1-2

Sec. 17. (a) No radiographic operation shall be conducted unless calibrated and operable radiation survey instrumentation as described in 410 IAC 5-5-9 is available and used at each site where radiographic exposures are made.

(b) A physical radiation survey shall be made after each radiographic exposure utilizing radiographic exposure devices or sealed sources of radioactive material to determine that the sealed source has been returned to its shielded position. The entire circumference of the radiographic exposure device shall be surveyed. If the radiographic exposure device has a source guide tube, the survey shall also include the guide tube.

(c) A physical radiation survey shall be made to determine that each sealed source is in its shielded position prior to securing the radiographic exposure device or storage container as specified in 410 IAC 5-5-5.

(d) A physical radiation survey shall be made after each radiographic exposure using radiation machines to determine that the machine is "off."

(e) Records shall be kept of the surveys required by 410 IAC 5-5-17(c). Such records shall be maintained for inspection by the

board for 2 years after completion of the survey. If the survey was used to determine an individual's exposure, however, the records of the survey shall be maintained until the board authorizes their disposition.

(Indiana State Department of Health; Rule HRH-2, PT E, Sec E.303; filed May 26, 1978, 3:30 pm: 1 IR 202; filed Feb 29, 1984, 10:10 am: 7 IR 933)
Cited in: 410 IAC 5-5-14.5; 410 IAC 5-5-18.

410 IAC 5-5-18 Temporary job site records

Authority: IC 13-1-2-9; IC 13-1-2-11; IC 16-1-3-13

Affected: IC 13-1-2

Sec. 18. Each licensee or registrant conducting industrial radiography at a temporary site shall have the following records available at that site for inspection by the board:

- (a) Appropriate license, (or certificate of registration) or equivalent document;
- (b) Operating and emergency procedures;
- (c) Applicable rules;
- (d) Survey records required pursuant to 410 IAC 5-5-17 for the period of operation at the site;
- (e) Daily pocket dosimeter records for the period of operation at the site; and
- (f) The latest instrument calibration and leak test record for specific devices in use at the site. Acceptable records include tags or labels which are affixed to the device or survey meter.

(Indiana State Department of Health; Rule HRH-2, PT E, Sec E.304; filed May 26, 1978, 3:30 pm: 1 IR 202; filed Feb 29, 1984, 10:10 am: 7 IR 934)
Cited in: 410 IAC 5-5-3.2.

410 IAC 5-5-19 Enclosed radiography; exemption; special requirements (Repealed)

Sec. 19.

(Repealed by Indiana State Department of Health; filed Feb 29, 1984, 10:10 am: 7 IR 829)

410 IAC 5-5-20 Instruction of radiographers; scope

Authority: IC 13-1-2-9; IC 13-1-2-11; IC 16-1-3-13

Affected: IC 13-1-2

Sec. 20. Subjects to be Covered During the Instruction of Radiographers

- (I) Fundamentals of Radiation Safety
 - (A) Characteristics of radiation
 - (B) Units of radiation dose (mrem) and quantity of radioactivity (curie)
 - (C) Significance of radiation dose
 - (1) Radiation protection standards
 - (2) Biological effects of radiation
 - (D) Levels of radiation from sources of radiation
 - (E) Methods of controlling radiation dose
 - (1) Working time
 - (2) Working distances
 - (3) Shielding
- (II) Radiation Detection Instrumentation to be Used
 - (A) Use of radiation survey instruments
 - (1) Operation

- (2) Calibration
- (3) Limitations
- (B) Survey techniques
- (C) Use of personnel monitoring equipment
 - (1) Film badges
 - (2) Thermoluminescent dosimeters
 - (3) Pocket dosimeters
- (III) Radiographic Equipment to be Used
 - (A) Remote handling equipment
 - (B) Radiographic exposure devices and sealed sources

- (C) Storage containers
 - (D) Operation and control of x-ray equipment
 - (IV) The Requirements of Pertinent Federal and State Rules
 - (V) The Licensee's or Registrant's Written Operating and Emergency Procedures
 - (VI) Case Histories of Radiography Accidents
- (Indiana State Department of Health; Rule HRH-2, PT E, Appendix A; filed May 26, 1978, 3:30 pm: 1 IR 203; filed Feb 29, 1984, 10:10 am: 7 IR 934)*
Cited in: 410 IAC 5-5-12.